Workspaces & Algorithms

Overview

- Workspaces
- Algorithms
- How do they play together?

Workspaces

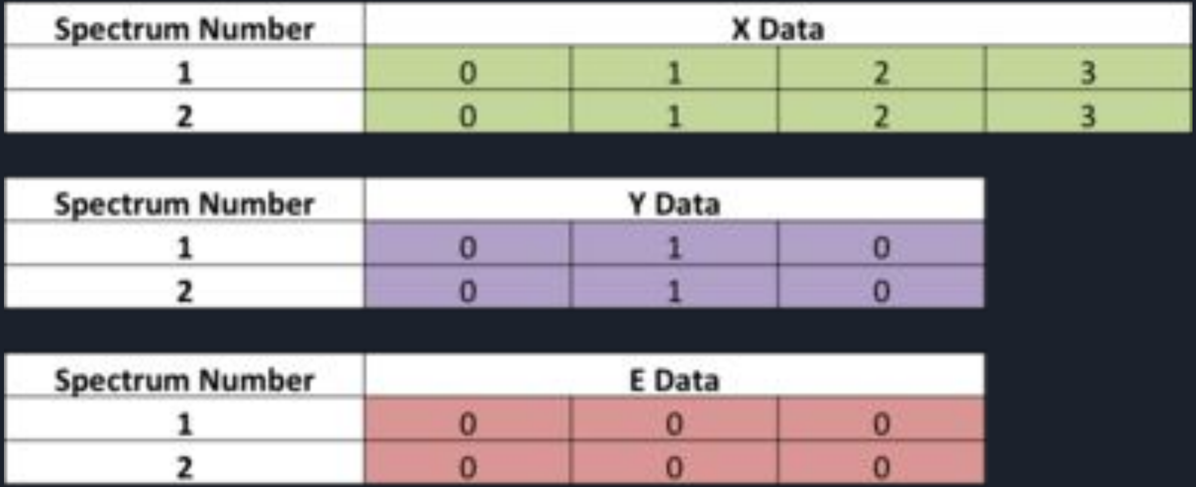
- The data structures for MANTID
- Written in C++
- Different classes store data differently:
  - `Workspace2D`
  - `EventWorkspace`
  - `TableWorkspace`
  - + other more specialized types that are not often used
- `MatrixWorkspace` is base of `EventWorkspace` & `Workspace2D`

Common Workspace Properties

- Workspaces hold more than the data:
  - Instrument geometry
  - Experiment logs
    - Run start/stop,
    - Proton charge
    - Sample temperature + many more
  - History of operations on workspace

MatrixWorkspace/Workspace2D

- `MatrixWorkspace` provides a histogram interface to data
- Workspace2D stores the actual histograms (a vector of Histogram objects that can contain point data!)



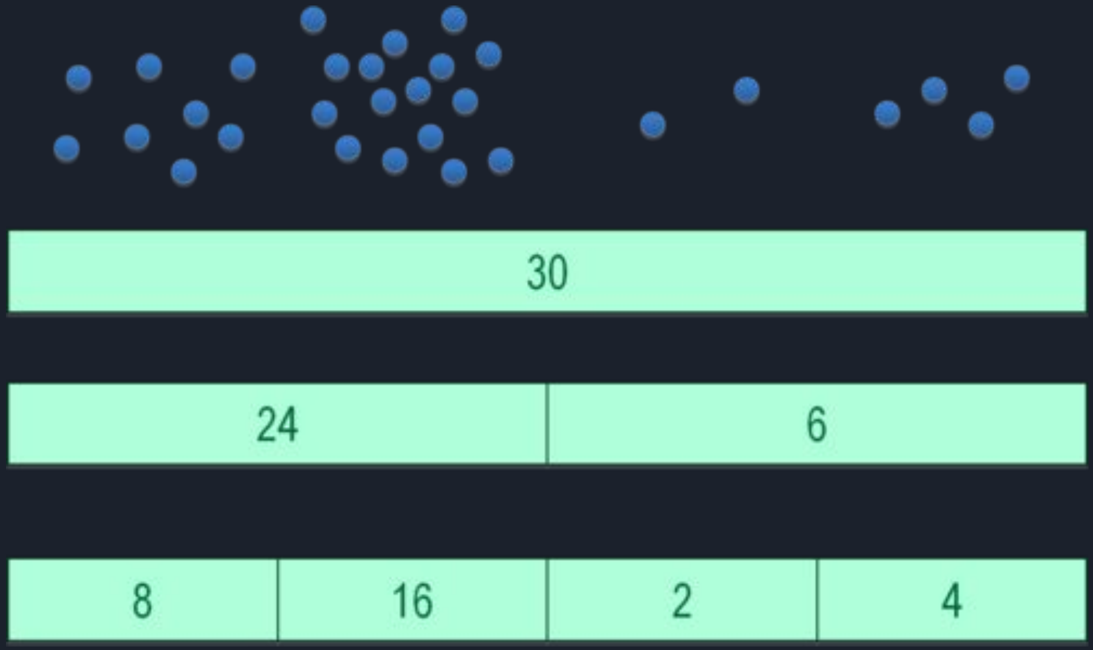
Spectrum Number	X Data			
1	0	1	2	3
2	0	1	2	3

Spectrum Number	Y Data		
1	0	1	0
2	0	1	0

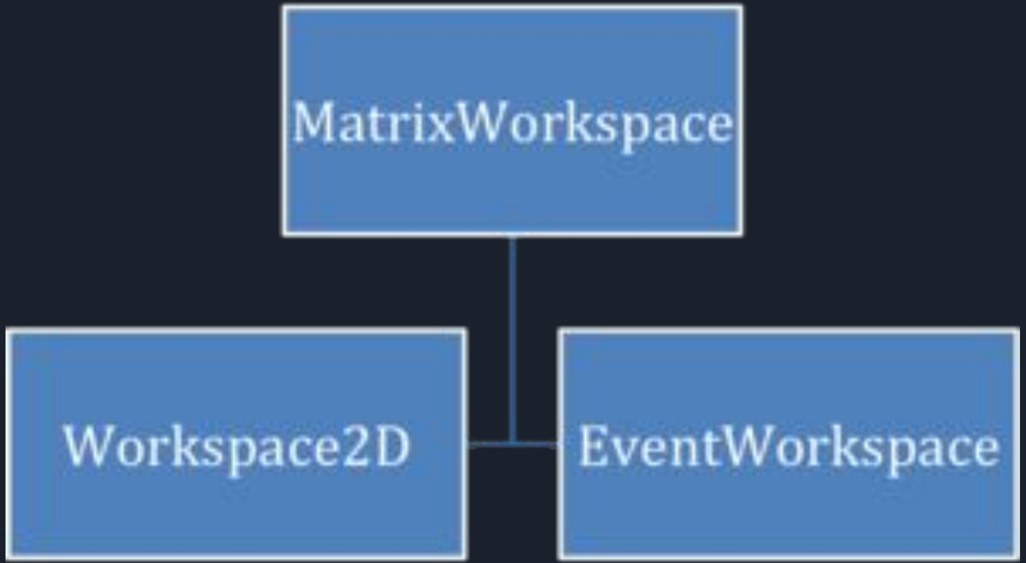
Spectrum Number	E Data		
1	0	0	0
2	0	0	0

EventWorkspace

- `EventWorkspace` holds “buckets” of timestamped events per spectrum
- Provides on-the-fly histogram representation



Relationships



MatrixWorkspace

Workspace2D

EventWorkspace

Algorithms

- Encapsulate operations
- Written in C++ or Python
- Provide consistent interface to setup and run some operation
    - An algorithm defines a list of input/output properties
    - Properties encapsulate input/output arguments
- Majority operate on workspaces
    - Perform some transformations on data
- Python functions for users are automatically generated

Algorithms & Analysis Data Service (ADS)

- Workspace given a name by adding it to the Analysis Data Service (ADS)
- Users generally just know this as the “Workspaces List”
- Algorithms considered in one of 2 “modes”:
- *Parent*:
  - Algorithm adds output workspace(s) to ADS at end of execution
  - History record is added to the workspace
- *Child*:
  - Output workspaces are **not** added to the ADS by default
  - No history is recorded
  - Use `createChildAlgorithm` inside a parent algorithm to set on up

Workflow Algorithms

- `WorkflowAlgorithms` are special types that **only** call other algorithms
- History records sub-algorithms called on workspace
- Great for encapsulating the workflow for a GUI

MESSAGE ENDS